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(54) Title of the Invention: A Bath Agent and a Method for its Manufacture

(57) [Abstract]

[Objective] To obtain a bath agent that has such effects as a warmth maintaining effect, a moisture maintaining effect and that leaves a clean feeling after bathing.

[Structure] It is a bath agent that is characterized in that it contains an aqueous extraction solution of soybeans and in that it contains an immersion solution of whole soybeans, skinned soybeans and defatted soybeans, a filtrate of soybean milk that has been subjected to ultrafiltration, soybean whey or a concentrated solution thereof.

[Effect] It has such effects as increasing the softness and smoothness of the skin after bathing, of increasing the warmth maintaining effect and of providing a gentle feel after bathing. It also has the effect of preventing a feeling of dryness and itching of the skin.

[Claims]

[Claim 1] A bath agent that contains an extraction solution of soybeans.

[Claim 2] A bath agent as described in Claim 1 in which the aqueous extraction solution contains of 0.1 to 50 g/100 ml, converted for glucose, of soluble sugar component of soybean.

[Claim 3] A bath agent as described in Claim 1 in which the aqueous extraction solution contains proteins, amino acids, oligosaccharides, saponins, isoflavones, vitamins, minerals and organic acids originating from soybeans.

[Claim 4] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is an aqueous immersion solution of whole soybean, skinned soybean and defatted soybean.

[Claim 5] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is a filtrate obtained by ultra filtration of soybean milk of which whole soybeans, skinned soybeans or defatted soybeans are the raw materials.

[Claim 6] A bath agent as described in Claims 1, 2 or 3 in which the aqueous extraction solution is whey obtained at the time of manufacture of separated soybean protein.

[Claim 7] A method for the manufacture of a bath agent characterized in that whole soybeans, skinned soybean or defatted soybeans are immersed for 5 minutes to 20 hours in water at 5 to 100°C, after which the soybeans are removed and in that it contains the immersion solution that is obtained or the concentrated immersion solution.

[Claim 8] A method for the manufacture of a bath agent characterized in that whole soybeans, skinned soybeans or defatted soybeans are immersed for 5 minutes to 20 hours in water at 5 to 100°C, after which the soybeans are removed and in that it contains the immersion solution that is obtained or the concentrated immersion solution.

[Claim 9] A method for the manufacture of a bath agent characterized in that it contains the whey that is produced when separated soybean protein is manufactured by standard methods or this whey which has been concentrated.

[Detailed Description of the Invention]

[0001]

[Field of industrial use] This invention relates to a bath agent in which an aqueous extraction of soybeans is compounded and to a method for its manufacture.

[0002]

[Prior art] Bath agents have been developed and used for the purposes of maintaining the warmth of the body obtained by bathing, of recovery from fatigue by promoting blood flow, of mitigating oversensitivity to cold, or moderating irritation of evening baths on the skin or of prolonging such effects on mood as the fragrance of the bath or the coloration of the skin.

[0003] Further, in the development of bath agents in recent years, in addition to the effect of maintaining warmth, development has proceeded in the direction of providing effects of a simple body care agent that creates a healthy state of the skin over the entire body and the use of many additives has been studied.

[0004] For example, diverse substances have been compounded, including products that provide a warmth maintaining effect by means of polyvalent alcohols such as glycerol, products in which proteolytic enzymes are compounded to increase the detergent effect, products in which oils are compounded to soften the skin and products in which fresh leaf extracts and vitamins are compounded. Bath agents such as these leave room for improvement in such aspects as safety, a warmth maintaining effect, moisture maintaining effect, and a clean feeling after coming out of the bath.

[0005] On the other hand, it has been confirmed that the glycosides of soybeans have various physiological actions and bath agents in which soybean extract phospholipids (Japanese Patent Application Early Disclosure No. 3-58919 [1991]) and humectants in which aqueous extracts of soybean hypocotyl (Japanese Patent Application Early Disclosure No. 63-243013 [1988]) are known.

[0006]

[Problems the invention is intended to solve] In all of these cases, attention has been drawn to specified components of soybeans and complicated processes are necessary in order to extract these components. The attention of the inventors was drawn to soybean immersion solutions that are produced as a by-product during the manufacture of *tofu* [bean curd] and studies were conducted for the purpose of their effective utilization. When this was done, it was unexpectedly confirmed that these immersion solutions themselves are effective as bath agents. It was also found that the filtrate that is produced as a by-product during ultrafiltration and concentration of soybean milk and the whey that is produced during the manufacture of separated soybean protein also have similar effectiveness. This invention was perfected on the basis of these findings. We shall now describe this invention more specifically.

[0007]

[Means for solving the problems] The aqueous extraction solutions of soybeans that are used in this invention are immersion solutions obtained by aqueous immersion of whole soybeans, skinned soybeans or defatted soybeans and "whey" that is produced as a by-product during manufacture of separated soybean protein or filtrates obtained when soybean milk is filtered with an ultrafiltration membrane. These components are components that are comprised of sucrose, raffinose, stachyose, saponin, isoflavone, proteins, amino acids, vitamins, minerals and organic acids originating from soy beans. An example of the components of the filtrate obtained when soybean milk is filtered with an ultrafiltration membrane is shown below.

[0008]

(1)	Oligosaccharides	
(2)	Proteins	0.35%
(3)	Amino acids	
(4)	Organic acids	0.30%
(5)	Isoflavones	0.08%
(6)	Saponins	0.01%
(7)	Lipids	less than 0.05%
(8)	Vitamins	0.03%
(9)	Minerals	

[0009] The various components described above can be found by the following analytical methods.

(1) High pressure liquid chromatography (sucrose, stachyose, raffinose)

(2) Total nitrogen content by the Kjeldahl method × 6.25

(3) Amino acid automated analysis method and high pressure liquid chromatography (arginine, lysine, histidine, phenylalanine, tyrosine, isoleucine, methionyl, amine, alanine, glycine, proline, glutamic acid, serine, threonine, aspartic acid, tryptophan, cysteine)

High pressure liquid chromatography (citric acid, malic acid, acetic acid)

High pressure liquid chromatography (daidzin, genistin, daidzein, genistein) (6)
High pressure liquid chromatography (group A and group B saponins)

(7) Soxhlet extraction method

(8) High pressure liquid chromatography and microorganism quantitative determination methods (B_1, B_2, B_6, H, niacin, panthothenic acid, inositol)

(9) Bernard molybdenic acid absorbance method, o-phenanthophosphorus absorbance method, atomic absorption method (P, Fe, Ca, Na, K, Mg, Zn)

When the soluble sugar components of this filtrate were determined by the phenolsulfuric acid method, the value converted for glucose was 2.05%.

[0010] Thus, the aqueous extraction solution of soybeans that is used in this invention is a solution that contains the various constituents in soybeans in a comprehensive way and the bath agent of this invention is characterized in that not only are specified components among these components used but that the extraction solution is used just as is.

[0011] These aqueous extraction solutions are prepared to a soluble sugar content of 1 to 20% and products can be made in which they are used in unaltered form or various substrates, fragrances and coloring agents are compounded with them. These aqueous extract solutions contain essentially no oleaginous components. Therefore, there is extremely little generation of unpleasant odors due to oxidation of oleaginous components and the products have excellent storage stability.

[0012] The soluble sugar components that are spoken of here are water-soluble saccharides (sucrose, raffinose, stachyose, saponins, and isoflavone glycosides) that are eluted by aqueous immersion and pulverization. They are found by the phenolsulfuric acid method (Biochemical Test Methods, A. General Methods [A-1 Reduced Sugars Quantitative Determination Method], University of Tokyo Press, published 15 February 1971) and are expressed as glucose conversion values.

[0013] Specifically, the test material (immersion water, filtrate obtained when soybean milk is filtered by an ultrafiltration membrane or soybean whey) is directly quantitatively determined by the phenolsulfuric acid method or the pH of the test material is adjusted to 4.5 with hydrochloric acid, the protein is precipitated, centrifugation is performed, the sugar concentration in the supernatant is determined quantitatively by the phenolsulfuric acid method and is found as the glucose value.

[0014] Below, we shall present specific descriptions of the methods of preparation of the aqueous extract solutions from the various raw materials and of the methods of manufacture of the bath agents. For example, when immersion solutions of skinned soybeans are used as the raw materials, whole soybeans are heated with hot air at 70 to 300°C and then pressed with a roller. When this is done, they are separated into cotyledon, hypocotyl and skin. The cotyledon part is collected and the skinned soybean is obtained. It is then immersed for 5 minutes to 20 hours in water of 3 to 20 times the weight of the soybeans.

[0015] The immersion temperature is 5 to 100°C. When the immersion temperature is increased, immersion time can be shortened. What is essential is that immersion is performed under conditions in which the water soluble saccharides in the soybeans can be sufficiently extracted. When immersed soybeans are used as raw materials for *tofu* [bean curd] and or soybean milk beverages, it is also necessary to consider extraction of proteins. Desirable conditions are 8 to 20 hours at 20 to 30°C, 1 to 6 hours at 40 to 55°C and 5 to 30 minutes at 70 to 90°C. By this means, the soluble sugar constituents in the immersion water amount to 0.1 to 5%.

[0016] After immersion, the materials are separated into soybeans and the immersion solution is used as the raw material. When whole soybeans are used as the raw materials, the conditions are the same except that immersion time is lengthened. When protein is eluted into this immersion solution and a product is made, it becomes a cause or turbidity and it is advisable to remove it. Methods that can be used for removal of protein include lowering the pH of the immersion solution to the isoelectric point of the protein and the

precipitate is removed. In addition, a method based on addition of acid is employed. However, a method in which the pH is lowered by lactic acid fermentation is preferable. The reason for this is that soybean odor can be mitigated by lactic acid fermentation.

[0017] For example, commercially sold lactic acid bacteria, such as Streptococcus thermophilus and Lactobacillus bulgaricus are added to the immersion solution and lactic acid fermentation is effected for 2 to 20 hours at 20 to 45°C. When the pH reaches 5.0 to 5.5, the solution can be centrifuged and the precipitate removed to obtain a clear solution. This clear solution can be used as a bath agent in unaltered form. However, good effects are not obtained when the concentration of soluble sugar constituents is low and when it is not added in large quantities to the bath. Therefore, it is desirable to concentrate it. For example, it can be concentrated at 45 to 65°C under reduced pressure of 600 to 700 mmHg. For the purpose of preservation and preventing growth of mold in the concentrated solution, on the order of 0.2% sodium benzoate can be added to fill the container and to make the bath agent product.

[0018] When an immersion solution of defatted soybeans is used, the defatted soybeans are immersed for 2 to 3 hours at 20 to 30°C and 0.5 to 1 hour at 40 to 55°C. In this case, in order to inhibit elution of protein as much as possible, it is desirable during immersion to carry out immersion with the pH of the immersion solution adjusted to 4 to 5 with an organic acid or an inorganic acid. Following that, the same treatment is performed as for skinned soybeans and an extraction solution is obtained.

[0019] When a filtrate of soybean milk obtained by ultrafiltration and concentration is used as the raw material, the soybean milk, which is obtained by the same methods as when *tofu* [bean curd] and soybean milk beverages are manufactured using whole soybeans and skinned soybeans as the raw materials, is concentrated with an ultrafiltration membrane of a fractionation molecular weight of 30,000 to 300,000, the filtrate that is produced is collected and is made into a bath agent in unaltered form or by concentration. At this time, the filtrate is subjected to lactic acid fermentation and may be made acidic to on the order of pH 5.0.

[0020] When the whey that is produced as a by-product during manufacture of separated soybean protein is used as the raw material, for example, 15 times its volume of water is added to defatted soybeans, the pH is adjusted to 7.5 with sodium hydroxide and the materials are stirred for 2 hours at room temperature, after which the solid matter and the solution are separated, the insoluble matter (bean curd lees) is removed and a solution containing protein is obtained. Its pH is adjusted to 4.5 with hydrochloric acid and the protein is precipitated, after which solid-solution separation is effected into protein fraction (separated soybean protein) and whey. The whey may be used in unaltered form or concentrated to make the bath agent.

[0021] Fragrances and pigments as well as inorganic salts, inorganic acids, raw drugs, vitamins, amino acids and enzymes that are ordinarily used in bath agents can be mixed as desired with the bath agents of this invention. In the use of these bath agents, they should be added so that the soluble sugar component comes to 0.1 to 5.0 g, and, preferably, 1.0 to 2.5 g, per 100 L of bath.

[0022] The bath agent that is obtained in this way has the effects of increasing the moistness and smoothness of the skin and of maintaining warmth and also of providing an invigorating feeling after coming out of the bath. It also has the effect of stopping feelings of dryness and itching of the skin. Moreover, it has the further effect of preventing the occurrence of dandruff by rinsing with hot water to which this bath agent has been added after washing the hair.

[0023] The aqueous extraction solution of this invention can be suitably concentrated, used in unaltered form or mixed with an ointment base material or it can be used as a topical skin agent. Examples are presented below.

[0024]

[Example 1]

Example 1

Whole soybeans were heated with hot air at 75°C, after which they were pressed with a roller, skinned, the skin and hypocotyl were removed and two lots of soybeans were obtained. The skinned

soybeans were immersed in a hot bath of 55°C the pH of which had been adjusted to 9 with an alkali, after which the immersion solution was separated. The soluble sugar component of this immersion solution was 0.99 g/100 ml. This immersion solution was sterilized by heating for 30 seconds at 145°C. It was then cooled to 40°C, lactic acid bacteria (Streptococcus thermophilus and Lactobacillus bulgaricus) were added and lactic acid fermentation was performed at 40°C to pH 5.0.

[0025] After the lactic acid fermentation, centrifugation (3,000 rpm) was performed and the supernatant that was obtained was concentrated at a reduced pressure of 650 mmHg and at 60°C to one-fourth it volume. Sodium benzoate was added to give 0.2%, after which it was filtered to make it clear. It was then filled into a container to make the bath agent product. The soluble sugar content in this product was 4.36 g/100 ml.

[0026] Example of Use

The bath agent described above was used for 7 days by men and women of ages 10 to 70 and they were interviewed about their impressions of it after bathing. The method by which it was used was to add on the order of 30 ml per approximately 100 L of bath water so that the soluble sugar content in the bath was 8 to 12 ppm. The results are shown in Table 1.

[0027] Table 1

Male in his teens: There was no more itching due to my atopic skin roughness after bathing.

Female in her twenties: I've had itching because of dry skin and have used commercial drugs. It was relieved.

Female in her twenties: There was no more itching after coming out of the bath. My skin had a smooth feeling.

Female in her thirties: The bath had a moist feel. My skin felt smooth.

Female in her thirties: My skin felt smooth. It had a warm feeling.

Male in his thirties: My skin felt smooth. It had a warm feeling.

Female in her forties: The water had a clean feel to it. My skin felt clean.

Female in her forties: My body was warm and I slept well.

Female in her fifties: The water was soft around me. My face was smooth. There was a luster to my hair.

Male in his fifties: I felt invigorated when I came out of the bath. My skin was moist. It was nice and warm.

Female in her sixties: There was no more itching after I came out of the bath.

Female in her seventies: There was no more itching after I came out of the bath.

[0028] Example 2

Whole soybeans were heated by hot air at 75°C, after which they were pressed with a roller, skinned, the skin and hypocotyl were removed and two lots of soybeans obtained. The skinned soybeans were ground while cold water (5°C) in the amount of 10 times their volume was being added with a paste being formed. This paste was heated for 30 seconds at 100°C, after which it was cooled to 80°C, solid-solution separation was performed with a screw decanter and soybean milk was obtained. The soybean milk that was obtained was deaerated, after which it was sterilized by heating for 3 minutes at 120°C and the protein concentration was adjusted to 5.0%. Following that, it was filtered with an ultrafiltration membrane of a fractionation molecular weight of 300,000 and the low molecular weight portion was recovered as the filtrate. The soluble

sugar content of this filtrate was 2.05 g/100 ml. It was then concentrated under reduced pressure to giver a soluble sugar content of 20.0 g/100 ml, a fragrance (citron essence) and a coloring agent (Yellow No. 202) were added, sodium benzoate was added to give 0.3% and the bath agent product was obtained. It was confirmed that this bath agent had the same effects as the bath agent of Example 1.

[0029] Example 3

Defatted soybean flakes were immersed for 1 hour at room temperature in 15 times their volume of water as the pH was being adjusted to 5.0 with lactic acid. After immersion, they were filtered and the filtrate was sterilized by heating for 1 minute at 140°C. The soluble sugar content of this filtrate was 0.98 g/100 ml. It was then concentrated under reduced pressure to one-fourth its volume and the concentrated solution was filtered and made clear, after which sodium benzoate was added to give 0.1%, it was filled into a container and the bath agent product was made. The soluble sugar content of this product was 3.90 g/100 ml.

[0030] Example 4

Whole soybeans were heated at 75°C by hot air, after which they were skinned and compressed. They were then defatted with hexane. Water in the amount of 15 times their volumes the pH of which had been adjusted to 7.5 with sodium hydroxide was added to these defatted soybeans and the were stirred for 2 hours at room temperature, after which solid-liquid separation was performed and the insoluble matter was removed. The solution containing protein that was obtained was adjusted to pH 4.5 with hydrochloric acid, the protein was precipitated and solid-liquid separation was again performed. Next, the protein portion was removed, sodium benzoate was added to the remaining solution to give 0.3% and a container was filled with it to make the bath agent product. The soluble sugar content of this product was 0.93 g/100 ml.